

CLAIMS

What is claimed is:

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- 1 1. A process comprising:
- 2 forming a metal interconnect structure onto a substrate;
- 3 forming a carbon-doped oxide (CDO) layer with a first concentration of carbon
- 4 dopants therein; and
- 5 continuing to form said CDO layer further with a second concentration of carbon
- 6 dopants therein, wherein the first concentration is different than the second concentration.

- 1 2. The process according to Claim 1 further comprising:
- 2 forming the CDO layer further with a third concentration of carbon dopants therein,
- 3 wherein there is a linear correlation of the concentration of carbon dopants between the first
- 4 concentration, the second concentration, and the third concentration.

- 1 3. The process according to Claim 1 further comprising:
- 2 forming the CDO layer further with a third concentration of carbon dopants therein,
- 3 wherein there is a concave nonlinear correlation between the first concentration, the second
- 4 concentration, and the third concentration.

1 4. The process according to Claim 1 further comprising:
2 forming the CDO layer further with a third concentration of carbon dopants therein,
3 wherein there is a convex nonlinear correlation between the first concentration, the second
4 concentration, and the third concentration.

1 5. The process according to Claim 1 wherein said first concentration is higher than said
2 second concentration.

1 6. A process according to Claim 1 wherein said first concentration is lower than said
2 second concentration.

1 7. A process comprising:
2 forming a carbon-doped oxide (CDO) layer with a first concentration of carbon
3 dopants therein; and
4 continuing to form said CDO layer further with a second concentration of carbon
5 dopants therein, wherein the first concentration is different than the second concentration.

1 8. The process according to Claim 7 further comprising:
2 forming the CDO layer further with a third concentration of carbon dopants therein,
3 wherein there is a linear correlation between the first concentration, the second concentration,
4 and the third concentration.

1 9. The process according to Claim 7 further comprising:
2 forming the CDO layer further with a third concentration of carbon dopants therein,
3 wherein there is a concave nonlinear correlation between the first concentration, the second
4 concentration, and the third concentration.

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10. The process according to Claim 7 further comprising:
forming the CDO layer further with a third concentration of carbon dopants therein,
wherein there is a convex nonlinear correlation between the first concentration, the second
concentration, and the third concentration.

1 11. The process according to Claim 7 wherein said first concentration is higher than said
2 second concentration.

1 12. The process according to Claim 7 wherein said first concentration is lower than said
2 second concentration.

1 13. An interlayer dielectric comprising:
2 a carbon-doped oxide (CDO) layer having a first region with a first concentration of
3 carbon dopants therein and a second region having a second concentration of carbon dopants
4 therein, wherein the first concentration is different than the second concentration.

1 14. The interlayer dielectric of Claim 15 further wherein said CDO layer has a third
2 region with a third concentration of carbon dopants therein, wherein there is a linear
3 correlation between the first concentration, the second concentration, and the third
4 concentration.

1 15. The interlayer dielectric of Claim 15 further wherein said CDO layer has a third
2 region with a third concentration of carbon dopants therein, wherein there is a concave
3 nonlinear correlation between the first concentration, the second concentration, and the third
4 concentration.

1 16. The interlayer dielectric of Claim 15 further wherein said CDO layer has a third
2 region with a third concentration of carbon dopants therein, wherein there is a convex
3 nonlinear correlation between the first concentration, the second concentration, and the third
4 concentration.

1 17. The interlayer dielectric of Claim 13 further wherein first concentration is higher than
2 said second concentration.

1 18. The interlayer dielectric of Claim 13 further wherein first concentration is lower than
2 said second concentration.

rule 126

1 ¹⁹ 22. A semiconductor structure comprising:
2 a carbon-doped oxide (CDO) layer having a first region with a first concentration of
3 carbon dopants therein and a second region having a second concentration of carbon dopants
4 therein, said CDO layer having a dual damascene structure formed therein; and
5 a conductive layer formed within said dual damascene structure, said conductive layer
6 having a via portion and a metal interconnect portion, wherein the first region is disposed
7 proximal to said metal interconnect portion and said second region is disposed proximal to
8 said via portion, said first concentration larger than said second concentration.

rule 126

1 ²⁰ 23. The structure of Claim ¹⁹ 22 further wherein said CDO layer has a third region with a
2 third concentration of carbon dopants therein, wherein there is a linear correlation between
3 the first concentration, the second concentration, and the third concentration.

rule 126

1 ²¹ 24. The structure of Claim ¹⁹ 22 further wherein said CDO layer has a third region with a
2 third concentration of carbon dopants therein, wherein there is a concave nonlinear
3 correlation between the first concentration, the second concentration, and the third
4 concentration.

rule 126

1 ²² 25. The structure of Claim ¹⁹ 22 further wherein said CDO layer has a third region with a
2 third concentration of carbon dopants therein, wherein there is a convex nonlinear correlation
3 between the first concentration, the second concentration, and the third concentration.

Rule 26

1 ²³ 26. The structure of Claim ¹⁹ 22 further wherein said CDO layer has a third region with a
2 third concentration of carbon dopants therein and a fourth region with a fourth concentration
3 of carbon dopants therein, wherein there is a convex nonlinear correlation between the first
4 concentration, the second concentration, the third concentration, and the fourth concentration.

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